

Amendments to the Drawings:

The attached replacement drawing sheet makes changes to Fig. 2 and replaces the original sheet with Fig. 2.

Attachment: Replacement Sheet

REMARKS

Claims 1-23 are pending in this application. By this amendment claims 1, 5, 10, 11, 13, 14 and 18, as well as the specification and Figure 2, are amended. No new matter has been added.

The drawings were objected to based on lack of reference character clarification for number 68 in Fig. 2 which has been removed, and number 200 which has since been labeled in the specification. It is respectfully requested that the objections be withdrawn.

Claims 5, 10, 11, 13, and 14 were objected to under an informality. They have since been amended to correct this. It is respectfully requested that the objection be withdrawn.

Claims 1, 4-7, and 16-19 are objected to under 35 U.S.C. §103(a) as being unpatentable over Cao (U.S. Patent No. 6,111,230) in view of Kishimoto (U.S. Patent No. 5,669,038) and further in view of Nishida (U.S. Patent Application Publication No. 2003/0072581). Applicants respectfully traverse these rejections.

Specifically, Applicants respectfully assert that neither Cao, Kishimoto, nor Nishida, disclose or suggest, a heating apparatus where an energization unit turns on and off a control signal twice or more and sets an on and an off period defined by a sum of an on time and an off time of the control signal to a period not matching an integral multiple of a half period of the AC power, as recited in independent claim 1, and similarly recited in independent claim 18. Additionally, Applicants respectfully assert that neither Cao, Kishimoto, nor Nishida, disclose or suggest, a heating apparatus where an energization unit is configured to energize the heat unit when a control signal is on and when a voltage value of an AC power crosses zero, as recited in independent claim 1, and similarly recited in independent claims 7, 18 and 19.

To the contrary, Cao does not disclose a heating apparatus wherein the energization unit is configured to energize the heat unit when a control signal is on and when a voltage

value of an AC power crosses zero. Instead, Cao has a counter which counts down from a predetermined amount loaded from a FUSDELAY register. When the counter reaches zero a firing pulse is sent which results in the energization of the lamp being at a point in time after the AC signal crosses zero. See, generally, Fig. 4, number 172, number 176 where the current turns on at varied time compared to when number 100 crosses zero.

Additionally, the sequence pulses in Cao gradually enlarge, and the energization start time is altered through decreasing the countdown sequence. See generally Fig. 4, number 160, 162, 174, 178 where second delay decreases, causing an increase in the AC current signal to lamp. As a result the energization of the lamp occurs at times which have no consistent relationship to the zero crossing. Accordingly, the only direct relation between the AC current supplied and the heat unit is that the heat unit is turned off when the AC power crosses zero. Therefore, Cao fails to disclose or suggest, a heating apparatus where an energization unit turns on and off a control signal twice or more and sets an on and off period defined by a sum of an on time and off time of the control signal to a period not matching an integral multiple of a half period of the AC power, and is configured to energize the heat unit when a control signal is on and when a voltage value of an AC power crosses zero.

Kishimoto fails to overcome the above-noted deficiencies of Cao. Specifically, Kishimoto teaches to turn on the heat-ON signal when the AC current crosses zero. See, for example, Figure 18d of Kishimoto. Applicants specification teaches some of the problems associated with such a system, with reference to Figure 13. As can be seen in Figure 13, the heater currents A and B either remain off (current A) or are large enough to still cause flicker (current B).

Since Cao discloses continually changing the time to turn ON the energization signal based on a changing timer so that it does not coincide with the zero crossing, one skilled in the art would not be motivated to combine the teachings of Cao with Kishimoto which has a

regular on time coinciding with the period of the AC signal crossing zero. Nishida also fails to provide any teachings or motivation to this end.

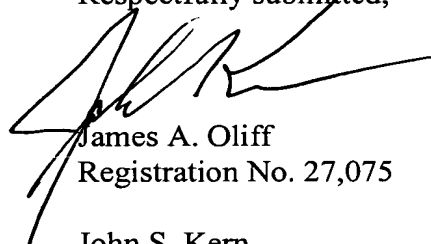
Accordingly, neither Cao, Kishimoto nor Nishida, disclose or suggest, a heating apparatus where an energization unit turns on and off a control signal twice or more and sets an on and off period defined by a sum of an on time and off time of the control signal to a period not matching an integral multiple of a half period of the AC power, and is configured to energize the heat unit when a control signal is on and when a voltage value of an AC power crosses zero.

Therefore, Applicant submits independent claims 1, 7, 18 and 19 define patentable subject matter. Claims 2-6, 8-17 and 20-23 depend from these claims, and therefore, also define patentable subject matter. Accordingly, Applicant requests that the respective objections and rejections be withdrawn.

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,



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JAO:DMK/brp

Attachment:
Replacement Sheet (Fig. 2)

Date: June 8, 2006

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